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## TECHNICAL NOTE

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U.S. DEPARTMENT OF THE INTERIOR - BUREAU OF LAND MANAGEMENT

### CATTLE DIETS

### AFFECT WILDLIFE HABITAT

Northern Utah, Northern Nevada, Southern Nevada

If ranges are to be managed to produce livestock and big game, it must be recognized that cattle, sheep, deer, elk and antelope can be more or less competitive. Season of use, rate of stocking, yearly weather variations, and other factors all affect the degree of competition between livestock and big game.

Smith and Doell (1968) presented the results of three complimentary studies which explain why and how cattle grazing in the summer and fall might help or hinder production of browse for big game winter use. During the two cattle grazing studies, phenological data was collected.

The first study covered four years (1961 - 1964) of summer use on deer winter range.

The browse species intensively studied was bitterbrush, but the other "most important" browse species present was big sagebrush.

Vegetation cover on the study area averaged 58% and was composed of 34% grass, 12% forbs and 54% shrubs.

Two cattle grazing intensities were used - arbitrarily set at 40% (moderate) and 50% (heavy) utilization of beardless wheatgrass. Other grass species receiving significant utilization were western wheatgrass, Great Basin wildrye, June grass, Kentucky and Sandberg bluegrasses and Letterman needlegrass.

Major forbs were arrowleaf and cutleaf balsamroots, cinquefoil, geranium and mule-ears.

Three grazing periods were used: early summer (late May or early June to late June or early July), midsummer (early July to early August), late summer (early August to early September.)

During this study in the winter of 1962-63, frozen soil and absence of snow pack caused heavy dieback of some shrubs, particularly snowberry. Rodent girdling damage was found on 90% of the bitterbrush plants after

the winter 1963-64. Bitterbrush cover was reduced 50% and sagebrush cover 30% as a result of this rodent activity.

Mean utilization percentages for four years of various forage species by cattle were:

	<u>Summer</u>					
	<u>Early</u>		<u>Mid</u>		<u>Late</u>	
	<u>Moderate/Heavy</u>		<u>Moderate/Heavy</u>		<u>Moderate/Heavy</u>	
Bitterbrush	5	13	29	36	31	41
Beardless Wheatgrass	41	62	31 <sup>1/</sup>	49 <sup>1/</sup>	36 <sup>2/</sup>	60 <sup>2/</sup>
All Grasses	31	41	22	32	22	35
Forbs	28	32	12	17	8	10

1/ In 1963-64 cattle were removed before 40% and 60% utilization of beardless wheatgrass occurred because of heavy utilization on bitterbrush.

2/ In 1964 cattle were removed before 40% and 60% utilization of beardless wheatgrass occurred because utilization of bitterbrush exceeded that of beardless wheatgrass.

The above table showed a striking increase in bitterbrush use by cattle as the summer progressed. This is true for both use intensities (stocking rates.) As the summer passed and forbs dried up, an obvious decrease in their use occurred. Use of grass also decreased but not to the extent that use of forbs did.

During the early summer period no use of bitterbrush was made until after 40 animal days of grazing per 5 ac. pasture had occurred.

During the midsummer period, substantial amounts of bitterbrush were taken from the outset of grazing.

During the late summer period, approximately half of the current growth of bitterbrush was consumed.

In the second study, cattle grazing began in late October or early November. This fall study area had a thin stand of big sagebrush and bitterbrush and an abundance of cheatgrass. Beardless wheatgrass and Sandberg bluegrass were the principal perennial grasses.

Grazing was not undertaken until green grass forage was present. During two years, fall grass growth was scanty due to below average precipitation.

Snow during three years made grass unavailable for short periods. Heavy frosts in two years seemed to increase use of bitterbrush.

Average figures for five years (1961-1965) of utilization data were:

Bitterbrush	21%
Beardless Wheatgrass	23% (3.29" tall) <sup>1/</sup>
Sandberg Bluegrass	37% (1.98" tall) <sup>1/</sup>
Cheatgrass	16% (1.38" tall) <sup>1/</sup>

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1 Before Grazing

Here again cattle took considerable bitterbrush even when utilization of grasses was not excessive.

In the third study on similar foothill game winter ranges in northern Utah, the authors investigated plant competition. They selected sites with similar vegetation but at different elevations, 4,800 feet and 5,600 feet.

For two seasons, they clipped all herbaceous vegetation (and in some cases removed shrubs) to ground level within five-foot radius circles around bitterbrush plants. Clipping was done at weekly intervals during early summer and less frequently later on.

They found that removal of competing vegetation increased bitterbrush twig length 41% at the 4,800 foot site and 58% at the 5,600 foot site. They further found that twig length increased by the above amounts regardless of density of competing vegetation (light 20-30% or heavy - 50% or more) or years (1959-60.)

Based upon the findings of all three studies, the authors concluded that "mixed browse - herbaceous ranges used by big game animals in winter should be grazed by cattle only prior to July 1 in northern Utah if use of bitterbrush is to be held to a minimum. Long term changes in vegetation may necessitate rotation grazing and use on different dates in order to equalize the effects of grazing among the several species in the stand."

They also concluded that "Cattle grazing in late fall is less harmful to bitterbrush during those years when fall precipitation induces herbaceous plant growth."

In summary, Smith and Doell suggest that the following "Management Considerations," based upon results of their studies, will minimize harmful effects of grazing on browse plants.

1. To maintain stable production of browse forage for game and herbaceous forage for livestock:

- a. Browse utilization by livestock must be kept at a low level.
  - b. Herbaceous forage must be grazed at the season and intensity that will maintain it but not permit it to increase at the expense of browse.
  - c. Each area may need to be grazed by cattle during different times to equalize grazing effects among the different plant species, since plants have different critical growth periods.
2. Increased bitterbrush growth due to reduced competition from herbaceous species may partially compensate for consumption of bitterbrush by cattle during early summer.
  3. Grazing by cattle during midsummer and late summer under both "moderate" and "heavy" intensities resulted in too heavy utilization of bitterbrush to permit a high level of use by game.
  4. It may be advantageous to permit moderate utilization of bitterbrush in order to obtain heavy use of grasses and forbs during the early grazing period so that the desired balance among the various vegetation components can be maintained. (Underscoring supplied.)
  5. It may not be easy to implement a management plan for fall grazing on critical game ranges which reserves substantial amounts of browse forage because of the uncertainty of conditions favorable to fall growth of herbaceous species.
  6. The impact of smaller animals on floral composition may be as significant as that of larger ones. An obvious conclusion is that off-setting rodent damage to browse might necessitate the reduction of livestock or big game use or both.

The ecological principles (plant-animal relationships) illustrated by the results of the above studies are very basic. In other areas, other plant species and differing animal diets will be important. In southwestern Colorado the most important plants to consider may be big sagebrush and blue-grama. In southern Nevada, they may be whitesage and galleta grass, if either of these species should be important to wildlife. Conner et al. (1963) worked at 4,500' elevation where only 1-3% of the ground was covered with plants. 90% of the plants were browse. Cattle diets (rumen-fistulated steers) consisted of:

AVERAGE BOTANICAL COMPOSITION OF FORAGE  
SELECTED BY FISTULATED STEERS

(Figures in %)

	<u>Year</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>
Grass	1959	34.7	14.0	9.2	2.3
	1960	85.0	39.8	.2	---
Whitesage	1959	63.2	85.3	80.0	97.7
	1960	6.8	43.7	85.7	79.5
Blackbush	1960	3.2	10.7	12.8	18.5
Total Browse	1959	64.3	85.4	90.7	97.7
	1960	15.0	60.1	99.8	99.0

Here again is a radical change in cattle diets as they switch from grass during the early season to browse later in the season. During July-August, 1960, even when grass was available, cattle consumed browse. Later, during September-October, after they had consumed almost all the grass, they subsisted entirely on browse, primarily whitesage.

In northern Nevada, in a typical sagebrush-grass type at 6,500' with 25-30% of the ground covered with plants, Conner et al, also found:

AVERAGE BOTANICAL COMPOSITION OF FORAGE  
SELECTED BY FISTULATED STEERS

(Figures in % - 1960)

	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
Grass	66.1	79.7	59.4	65.8
Forbs	26.4	2.4	3.2	.4
Bitterbrush	1.0	13.0	32.4	28.3
Total Browse	7.6	17.9	37.3	33.8

Generally increasing consumption of bitterbrush and browse as the season progressed was similar to that found by Smith and Doell in northern Utah.

Study of all the foregoing data reveals that cattle cannot be considered as solely grass eaters. In each instance where livestock and big game jointly use ranges, available knowledge must be used and correctly interpreted and applied if a management goal is to minimize conflict between big game and cattle.

REFERENCES:

Connor, J.M., V.R. Bohman, A.L. Lesperance and F.E. Kinsinger. 1963. Nutritive evaluation of summer range forage with cattle. J1. Animal Sci. 22:961-969.

Smith, A.D. and D.D. Doell. 1968. Guides to allocating forage between cattle and big game on big game winter range. Utah St. Div. of Fish and Game Publication No. 68-11.

PLANT LIST

Arrowleaf Balsamroot	<u>Balsamorhiza sagittata</u>
Beardless Wheatgrass	<u>Agropyron inerme</u>
Big Sagebrush	<u>Artemisia tridentata</u>
Bitterbrush	<u>Purshia tridentata</u>
Blackbush	<u>Coleogyne ramosissima</u>
Bluegrama	<u>Bouteloua gracilis</u>
Cheatgrass	<u>Bromus tectorum</u>
Cinquefoil	<u>Potentilla spp.</u>
Cutleaf Balsamroot	<u>Balsamorhiza macrophylla</u>
Galleta grass	<u>Hilaria jamesii</u>
Geranium	<u>Geranium fremontii</u>
Great Basin Wildrye	<u>Elymus cinereus</u>
June grass	<u>Koeleria cristata</u>
Kentucky bluegrass	<u>Poa pratensis</u>
Letterman needlegrass	<u>Stipa lettermani</u>
Mule-ears	<u>Wyethia amplexicaulis</u>
Sandberg bluegrass	<u>Poa secunda</u>
Snowberry	<u>Symphoricarpos oreophilus</u>
Western wheatgrass	<u>Agropyron smithii</u>
Whitesage	<u>Eurotia lanata</u>